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ABSTRACT

This curriculum guide was developed for use with public television's Nature series. The materials in the guide are designed to help students actively participate in the study and experience of nature. Students are encouraged to view the programs as naturalists would, observing animals in their environment, noting their behavior, examining the factors that affect their condition, and drawing conclusions. Each lesson in the Teacher's Resource Guide includes: (1) a "Program Overview" that presents background information and brief synopses of the program to be viewed; (2) "Objectives" that provide the teacher with measurement goals; (3) "Before Viewing Activity" that familiarizes students with the subject and allows them to set purposes for viewing; (4) "Vocabulary" that features definitions of unfamiliar words used in each program; (5) "After Viewing the Program" that provides discussion questions to help students assess the main points of the program; (6) "Suggested Reading" for students who may want to learn more about the topic; and (7) a "Naturalist's Guide" (student worksheet) to be duplicated and distributed to students. The programs highlighted in this guide focus on the history of the Polynesians, a seafaring people who set forth more than 2000 years ago to discover and settle countless islands in the South Pacific. Program titles include "The Faraway Heaven," "Crossroads of the Pacific," "Burning their Boats," "Distant Horizons," and "The Pierced Sky." (WRM)

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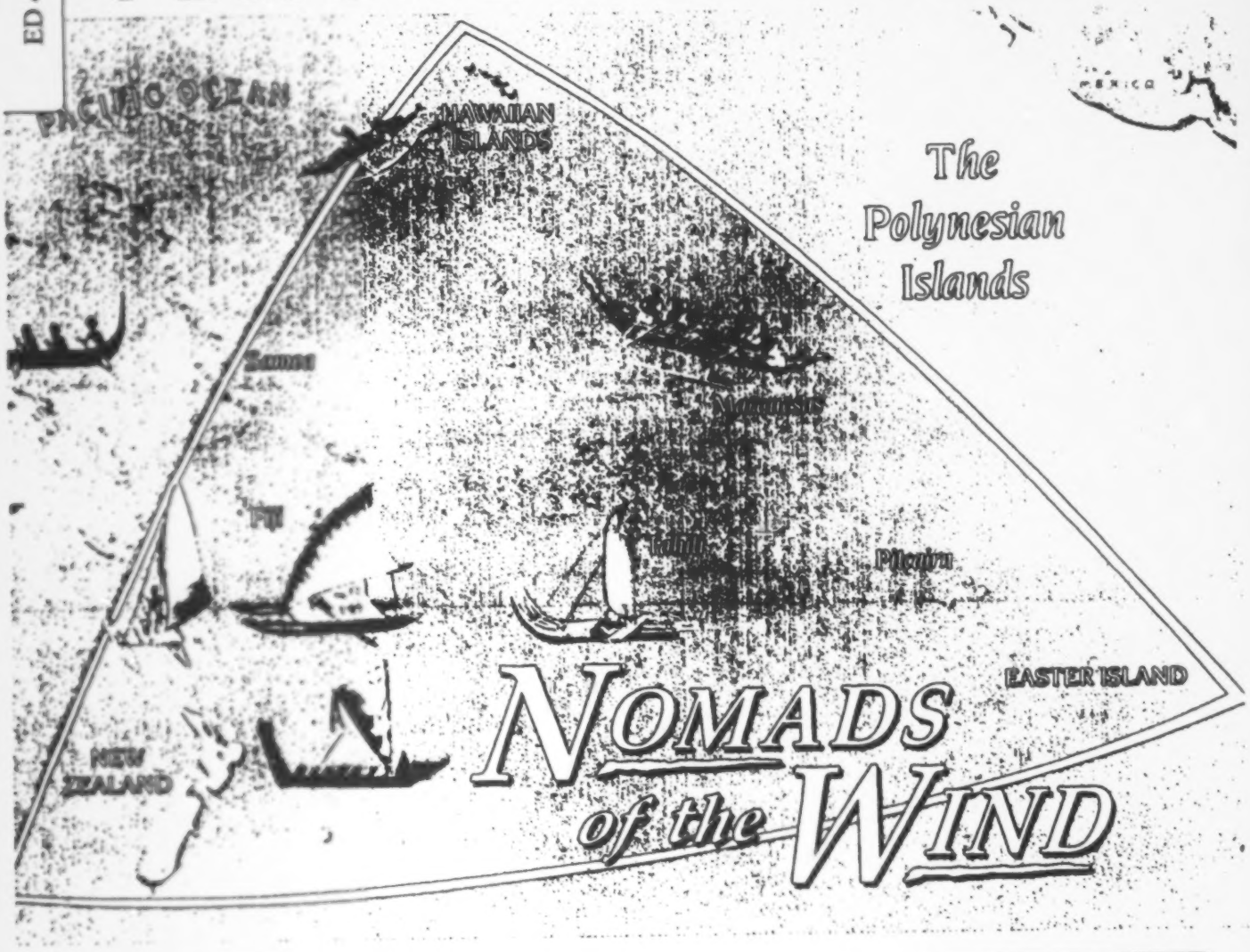
TEACHER'S GUIDE



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NATURE

NATURE is produced for PBS by Thirteen/WNET in New York.
NOMADS OF THE WIND is a coproduction of Thirteen/WNET and BBC-TV.
The NOMADS OF THE WIND videotape library and this special Teacher's Guide are made possible in the U.S. by a grant from the Liz Claiborne Foundation.

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ENTER THE WORLD OF THE NATURALIST

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The NOMADS OF THE WIND videotape library and this special Teacher's Guide are made possible in the U.S. by a grant from the Liz Claiborne Foundation.

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INTRODUCTION

This Teacher's Resource Guide has been developed for use with Public Television's NOMADS OF THE WIND, a five-part NATURE miniseries. Hosted by George Page, NOMADS OF THE WIND recounts the history of the Polynesians, a seafaring people who set forth more than 2,000 years ago to discover and settle countless islands of the central Pacific. The series traces the natural history of these islands and their original settlers. The programs explore the Polynesians' expert navigational skills and their ability to use every resource the land had to offer. The series also documents the arrival of the Europeans and their impact on the established Polynesian societies that had been sustained by the land and the sea for thousands of years.

THE EDUCATIONAL MATERIALS

These materials have been designed for use in social studies, science, and environmental studies classes. Their aim is to help students enjoy and actively participate in the study and experience of nature. Activities encourage students to view the programs as naturalists would, observing animals in their habitats, noting their behavior, examining the factors that affect their condition, and drawing conclusions. NOMADS OF THE WIND explores the history of the Polynesian people. Many of the activities in this guide involve an examination of Polynesian culture and traditions.

Each lesson in the Teacher's Resource Guide includes:

- *Program Overview* that provides a brief synopsis of the program to be viewed;
- *Objectives* that provide the teacher with measurable goals;
- *Before Viewing the Program* that familiarizes the students with the subject and allows them to set purposes for viewing;
- *Vocabulary* that provides definitions of unfamiliar words used in each program;
- *After Viewing the Program* that provides discussion questions to help students assess the main points of the program;
- *Suggested Reading* that contains books and periodicals for those who may want to read more about the topic;
- *Naturalist's Guide* (student worksheet) that may be duplicated and distributed to students. The student worksheet contains activities that encourage students to view the programs as naturalists or anthropologists would in order to gain a better understanding of the themes presented. The guide encourages family viewing and contains cooperative learning activities.

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OBJECTIVES

Students will:

- observe and analyze how natural forces contribute to the development of an island;
- examine and identify how Polynesians used, conserved, and protected natural resources;
- explore and analyze the attributes of a lagoon.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

atoll *noun:* an island consisting of a coral reef surrounding a lagoon.

coral reef *noun:* a rock-like land feature in the ocean formed by the skeletal remains of small anemone-like polyps found in tropical waters.

lagoon *noun:* a shallow sound, channel, or pond separated from the sea or ocean by low ridges of sand or a surrounding coral reef.

nutrient *noun:* a nourishing substance; food.

taboo *noun:* behavior that is forbidden by the people within a society.

SUGGESTED READING

For students who want to learn more about this topic, suggest the following:

Emory, Kenneth ... et al. "A Four-Part Look at the Isles of the Pacific." National Geographic Magazine, vol. 146, no. 6 (December 1974): 732-793.

THE FARAWAY HEAVEN

PROGRAM OVERVIEW

Thousands of years ago, double-hulled canoes carried voyagers across the Pacific Ocean to settle the tropical islands of Tahiti and the Marquesas. The Polynesians who piloted those vessels were expert sailors who used their knowledge of ocean currents, the winds, and the stars to navigate vast distances. Carrying the essentials to support life as well as the artifacts of their culture, those seafaring pioneers settled and cultivated remote islands thousands of miles from any continent.

The Polynesians were skilled gardeners who transplanted their precious cargo of seeds and cultivated plants into the rich soil of high oceanic islands. While they waited for their crops to mature, they used the rich resources of the islands. Lagoons, freshwater streams, and the surrounding ocean supplied a wealth of marine life; they gleaned coral reefs for other edibles.

"The Faraway Heaven," Program One of the miniseries NOMADS OF THE WIND, documents how the first settlers of Tahiti and the Marquesas used the natural resources of the islands along with those they had brought to manage their new surroundings and establish a way of life.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Write *Tahiti, Hawaii,* and *New Zealand* on the chalkboard. Have students work in groups to share what they know about these places, including their location, climate, geography, people, plants, wildlife, and culture. After about five minutes, have groups share their information. Record their ideas about each category on the chalkboard. Have a volunteer locate the islands on a globe or a map. Explain that the Polynesian islands form a triangle that spans the breadth of the Pacific. Ask students how they think those remote islands were settled and where the settlers might have come from. Tell them that the program they will see, "The Faraway Heaven," recounts the discovery of Tahiti and the Marquesas islands 2,000 years ago by the first Polynesian voyagers.

Distribute the Naturalist's Guide (student worksheet)

Duplicate and distribute the Naturalist's Guide (Student Worksheet) to students and preview it with them. As they watch the program, students should note the contrasts between the Marquesas and Tahiti. Have them consider how natural forces helped to form each island and how those forces contributed to the development of each island's plant and animal life.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. How did the resources of Tahiti aid the Polynesians while they waited for their crops to take root? (Lagoons, streams, and coral reefs provided food fish and other edibles; the coconut palm provided food and raw material for building; the climate and availability of freshwater contributed to survival.)
2. Why do you think the frigate bird is a good Polynesian symbol? (Frigate birds can travel long distances over the ocean and seem to have the ability to find land.)
3. What was the value of *taboo* to the Polynesians? (It imposed a rule on property and places. It helped protect and preserve resources such as pigs, breadfruit, and bananas.)
4. What makes some islands more suitable for human settlement than others? (Physical features provide conditions that may allow plants and wildlife to flourish. Tahiti's coral reef provides shelter from ocean storms. Fish thrive in lagoon waters that are fed by the runoff of streams carrying rich nutrients. In contrast, the Marquesas' rugged terrain, rocky cliffs, and unprotected coast make human settlement more difficult.)

THE FARAWAY HEAVEN

A naturalist examines the interrelationships among plants, animals, and the environment.

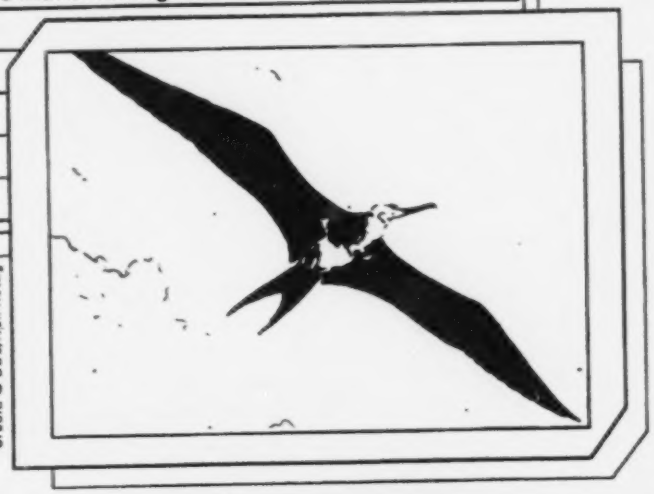
Complete one activity from among the following:

TAHITI AND THE MARQUESAS

As you view the program, compare the physical features of Tahiti with those of the Marquesas. Describe how some features have proved to be beneficial to the people who settled there. For example, Tahiti's coral reef protects the island from ocean storms and contributes to the abundance of sea life. In contrast, the Marquesas lack a coral reef.

Make a chart like the one below to help organize your thoughts. Discuss your findings with a group. Decide which of the islands, Tahiti or the Marquesas, would be better to live on and why. Make a presentation of your findings to the class.

TAHITI **Physical Feature**	**Benefit**
Coral Reef	protects the island from ocean storms;
	plentiful fish and other marine life
Lagoon	abundance of fish and other marine life;
	calm waters make fishing easier
Mountains	
Trade Winds	



Credit: © BBC/Neil Rettig

Because of its ability to travel long distances over the ocean and find land, the frigate bird was an important symbol for the Polynesians.

NATURAL RESOURCES

The Polynesians who first settled Tahiti were good conservationists. They utilized, conserved, and protected natural resources in order to renew, not deplete, them. With a group, discuss how each of the following was used: breadfruit, coconut palms, Barringtonia nuts, pigs, banana trees. Discuss how the Polynesians conserved and protected those resources. Display your findings in a chart or on a bulletin board.

THE LAGOON

The lagoon was vital to the survival of the first Polynesians on Tahiti. Investigate how a lagoon is formed, the marine life that inhabits it, and how it is beneficial to the human inhabitants of an island. Make a model or draw a diagram of a lagoon. Use it along with your research to make a presentation to your class.

OBJECTIVES

Students will:

- identify and examine how the Polynesians transported, used, and conserved resources and cultural traditions;
- observe and analyze how plants and wildlife travel and adapt to new environments;
- investigate the characteristics of a coral reef.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

chasm *noun:* a deep cleft in the earth; gorge.

iridescent *adjective:* having or displaying a play of colors producing rainbow effects.

plankton *noun:* small animal and plant life within a body of water that floats or drifts at or near the surface.

tack *verb:* to change the direction of a sailing ship by turning the bow to the wind and shifting the sails.

tapa *noun:* cloth made from the bark of the paper mulberry tree.

SUGGESTED READING

For students who want to learn more about this topic, suggest the following:

Thomas, Stephen D. *The Last Navigator.* New York: Henry Holt, 1987

CROSSROADS OF THE PACIFIC

PROGRAM OVERVIEW

Located at the western rim of the Polynesian triangle are the island groups of Tonga, Samoa, and Fiji. Thousands of years ago, the people of Southeast Asia migrated to those faraway islands. Surrounded by hundreds of miles of coral reef and fed by waters rich in nutrients, Fiji was the fertile settling ground of the first Polynesians. There they grew root crops, built canoes, and fished. From there the first great voyages were launched eastward across the Pacific.

In contrast to the rich resources of Fiji, the terrain of the islands of Tonga and Samoa was not as fertile. The Samoans and Tongans depended on trade for their livelihood. The Fijians, Tongans, and Samoans were skilled navigators whose knowledge of the winds, the currents, and the stars helped them sail across thousands of miles of ocean in search of new homelands.

"Crossroads of the Pacific," Program Two of the mini-series NOMADS OF THE WIND, examines the civilization of the first Polynesians on Fiji. It follows these people as they crossed thousands of miles of ocean to settle the islands of Polynesia. The program also highlights how various species of plants and animals traveled to and settled on distant islands.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Offer the following scenario to the class: You are about to embark on an ocean voyage to a distant, uninhabited island. Your journey will take place in a large, wooden canoe, and you will take with you the essentials to survive for many years. What will you take? Why?

Have students work in groups to list the items they would take and the reasons for their choices. Allow groups time to briefly share what they would take and why.

Tell them that the program they will see, "Crossroads of the Pacific," documents how Polynesian voyagers journeyed thousands of miles across the Pacific, bringing the essentials of both physical and spiritual life that were the hallmarks of the world they were leaving behind.

Distribute the Naturalist's Guide (student worksheet)

Duplicate and distribute the Naturalist's Guide (student worksheet) to students and preview it with them. As they watch the program, students should note the items that the Polynesians took with them as they journeyed to new islands. Encourage students to notice how items were prepared for the voyage and to consider why those items were included.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. How did the settlement on Fiji affect the wildlife and plant life of the island? (Many species of animals were hunted to extinction. The forests were cut to make room for settlements and agriculture.)
2. How were the eggs of a tree frog able to survive ocean travel? (In this species of tree frog, there is no tadpole stage. The young emerge as froglets, which are less vulnerable than tadpoles.)
3. What Fijian plants do you consider to be the most essential and why? (yam: a staple, could be stored for months; coconut: multipurposes, including food, drink, raw material for making rope, houses, bowls, and sandals)

CROSSROADS OF THE PACIFIC

A naturalist observes how plants and wildlife adapt to new environments.

Complete one activity from among the following:

COMPARING ESSENTIALS FOR LIFE

As you view the program, examine the various items such as tools, plants, animals, food, and water, that the Polynesians brought on their voyages. List each item, how it was prepared for travel, and the reason you think it was included. Compare this list with the list of items that you made before viewing the program. What would you add to or delete from your first list now that you have seen the program?

Item	How prepared for travel	Reason included
water		
chicken		
pig		
breadfruit		

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Fijian women make tapa cloth from the bark of the paper mulberry tree.

THE CORAL REEF

The presence of hundreds of miles of coral reef was a vital element in the survival of the Fijian people. Investigate how a coral reef is formed, the marine life that inhabits it, and how a coral reef is beneficial to the human inhabitants of an island. Locate major coral reefs on a world map. Research which are threatened and why they are threatened. Make a model or draw a diagram of a coral reef. Use it along with your research to make a presentation to your class.

MAKING A CLOTH DESIGN

Fijians decorated cloth made from the inner bark of the paper mulberry tree. This cloth was known as tapa. They decorated the fabric with geometric designs using stencils cut from banana or palm leaves. Create your own geometric cloth design. Make a stencil and use colored pencils or felt-tipped pens to transfer the design onto paper or cloth. Make a display with others in your class who have chosen this activity.

THE SKILLS TO SURVIVE

The Fijians possessed many skills that were vital to life. Among them were fire making, navigation, gardening, pottery making, and making cloth. With a group, discuss why these skills were so important. Young people learned these skills from family members. What important skills do we learn from family members today? from school? from friends? from other sources? How are the skills that young people learn in our society vital to life? Create a chart or diagram that highlights your conclusions. Display it on the bulletin board.

OBJECTIVES

Students will:

- investigate Polynesian methods of navigation;
- observe and analyze how plants and wildlife are affected by isolation.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

clone *noun:* a group of plants or animals produced from a single individual without sexual reproduction.

maelstrom *noun:* a great or turbulent whirlpool.

millennia *noun:* thousands of years.

SUGGESTED READING

For students who want to learn more about this topic, suggest the following:

Blanchard, Anne. *Navigation: A 3-Dimensional Exploration.* New York: Orchard Books, 1992.

BURNING THEIR BOATS

PROGRAM OVERVIEW

Pitcairn and Easter Island symbolize remoteness and finality. The *Bounty* mutineers who fled to Pitcairn and the seafaring Polynesians who settled Easter Island and built the mysterious stone statues that dominate it committed themselves to lives of isolation. In a moment of madness, the *Bounty* mutineers burned their ship, marooning themselves on the isolated speck of land that is Pitcairn.

On Easter Island, a growing population and diminishing natural resources had devastating effects. Fierce disputes raged as the islanders fought over food and space. Decimated forests could no longer provide materials for canoes. The islanders were stranded. There was no means of escape.

The wildlife of remote Pacific islands also have metaphorically burned their boats. Carried to the islands by winds and currents and cut off from the outside world, many of the plants and animals of those islands have evolved to become unique species.

"Burning Their Boats," Program Three of the miniseries NOMADS OF THE WIND, documents the tragedy of Easter Island and the isolation of Pitcairn as well as the triumph of the Polynesians who, lacking charts or compasses, used the wind, currents, and the stars to navigate across thousands of miles of ocean to establish their unique way of life on those remote islands.

BEFORE VIEWING THE PROGRAM

Introducing the Program

On the chalkboard, write the phrase:

They burned their boats.

Ask students to explain what the phrase means. Explain to them that in 1789 the mutineers of the *HMS Bounty* found sanctuary on Pitcairn Island. In a moment of madness, the sailors set fire to the ship, committing the entire group to a life of isolation. Ask students to speculate about what it would take to survive under such circumstances. Then have them locate Easter Island and Pitcairn Island on a world map. Have students note the remoteness of those islands.

Explain that the program they will see, "Burning Their Boats," investigates what happens when plants, animals, and humans live on isolated islands.

Distribute the Naturalist's Guide (student worksheet)

Duplicate and distribute the Naturalist's Guide (student worksheet) to students and preview it with them. As they watch the program, students should note how isolation affects human beings and various species of plants and animals.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. The *Bounty* mutineers marooned themselves by burning their ship. How did plant and animal species "burn their boats?" (Answers may include: the Henderson chicken became flightless; the fitchia plant produced seeds too large for birds to carry off the island.)
2. How could the Polynesians have used "El Nino" to their benefit? (The Polynesians could have used El Nino to return to their original islands if the islands they had settled did not support life.)
3. Why is Henderson Island considered a paradise for birds? (Few predators; remoteness creates a safe haven for mating and rearing young.)
4. What caused the decline of civilization on Easter Island? (Increased population, depletion of natural resources, and drought contributed to the decline. The island could not support the growing population.)

BURNING THEIR BOATS

A naturalist investigates the various ways species travel.

Complete one activity from among the following:

WITHOUT CHARTS OR COMPASSES

As you view the program, take notes about methods the Polynesians used to navigate great distances without charts or compasses. Work with a group to examine how they used winds, waves, cloud formations, currents, star constellations, bird sightings, and *El Niño*. Use library resources such as those listed below to supplement your investigation. Also use your findings to create a mural showing Polynesian methods of navigation. Include a description of each navigation method.

Lewis, David. "Wind, Wave, Star, and Bird," National Geographic, vol. 146, no. 6 (December 1974): 747-754.

Thomas, Stephen D. *The Last Navigator.* New York: Henry Holt, 1987.

MUTINY!

The story of the mutiny by the crew of the *Bounty* is true. Imagine you are a sailor on the *Bounty* who flees with your fellow mutineers to Pitcairn Island, a remote speck in a vast ocean. In a moment of madness, one of your shipmates sets fire to the ship. Write a diary entry in which you describe the island and express your feelings about spending the rest of your life there. Describe your plans to build a new life. Share your entry with others who have chosen this activity.

© BBC/Peter Crawford

The ancient moai, the statues for which Easter Island has become so famous, stand in silent testimony to the people who created them and who died out due to war and depleted resources. Here they are being filmed for NOMADS OF THE WIND.

TRAVEL AND ADAPTATION

Various species of plants and animals survived in isolation on remote Pacific islands. Some had been carried by the wind, some by water. Seeds often traveled attached to the feathers of birds or carried in their stomachs.

Brainstorm with your group to identify isolated species that evolved and survived. Explore how each traveled to its location. Examine factors that contributed to its survival such as lack of predators, plentiful food sources, and the ability to reproduce without a mate. Use a chart such as the one below to organize your thinking. Combine your group's findings with those of other groups to create a single chart for the bulletin board.

Plant or Animal	How it traveled to location	How it adapted

OBJECTIVES

Students will:

- observe and analyze the varied plant and animal life found on Hawaii and New Zealand;
- examine how the isolation of the Polynesian islands resulted in the proliferation of many unique species;
- examine how the isolation of the islands added to the vulnerability of species;
- explore how the arrival of people on Hawaii and New Zealand affected the natural resources.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

evolution *noun:* the process by which plant and animal species gradually change over time.

fossil *noun:* any evidence of a living thing more than 10,000 years old.

Maori *noun:* the Polynesian people who first settled New Zealand.

navigation *noun:* the science of directing a ship or aircraft on its course.

SUGGESTED READING

For students who want to learn more about this topic, suggest the following:

Finney, Ben, et. al. *A Cultural Odyssey Through Polynesia.* Berkeley: University of California Press, 1995.

Kyselka, Will. *An Ocean in Mind.* Honolulu: University of Hawaii Press, 1987

DISTANT HORIZONS

PROGRAM OVERVIEW

The last two areas settled by the Polynesians were Hawaii and New Zealand. These diverse lands, located at remote corners of the Polynesian Triangle, possess a wide variety of distinctive flora and fauna that evolved in response to unique island conditions.

The first plants and animals to colonize the Hawaiian islands came from Southeast Asia. Those species were carried by the current at least 2,500 miles across the open ocean. Hawaii's exceptional climate and isolation helped many of those pioneer species evolve into varieties of new species. When the Polynesians arrived, they encountered unusual animals such as flightless birds. The new settlers raised the plants and animals that they had brought and created devices for capturing and using native wildlife.

Centuries later another group of Polynesians, the Maori, discovered the islands we know as New Zealand. In contrast to the settlers of Hawaii, the Maori found that most of the plants and animals they brought did not survive in the cooler climate and thinner soils of their new home. The Maori had a difficult life and many died young. Yet they managed to adapt to their new environment.

"Distant Horizons," Program Four of the miniseries NOMADS OF THE WIND, documents the Polynesians' initial voyages to the Hawaiian islands and New Zealand. The program highlights the unique species that evolved in response to the isolation and climate of those remote islands.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Call on a volunteer to locate the Hawaiian islands on a map. Mention that Hawaii is located at the northernmost point of the Polynesian Triangle and consists of more than 100 islands. Ask students to share what they already know about Hawaii, including its inhabitants, customs, wildlife, geography, and climate. Record students' responses on the chalkboard. Point out that Hawaii is in an even more remote location than other Polynesian islands. Suggest that this isolation led to the evolution of unique species. Because Hawaii is no longer isolated, these species are particularly vulnerable to extinction.

Distribute the Naturalist's Guide (student worksheet)

Duplicate and distribute the Naturalist's Guide (student worksheet) to students and preview it with them. As they watch the program, students should write the names of some species they find especially interesting. They may wish to make quick sketches of some unique plants and animals that they can research afterward.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. Why do naturalists consider Hawaii to be "one of the world's greatest living museums of evolution"? (The species on Hawaii help scientists trace how wildlife and plant life adapted in the isolated environment.)
2. Why did some of Hawaii's birds and insects become flightless? (Flying requires a lot of energy. Abundant food and the lack of predators created an environment in which flying was not necessary.)
3. How do the climate and geography of Hawaii compare with New Zealand's? (Hawaii's tropical climate and numerous volcanoes contrast with New Zealand's cooler climate and landscape of mountains, glaciers, and meadows.)
4. During the four-month Festival of Makahiki, Hawaiians were not allowed to work their fields, to sail or to fight. How was this ban an indication of their prosperity? (Without abundant natural resources, the Hawaiians would not have been able to take a four-month respite.)

DISTANT HORIZONS

A naturalist observes how plants and animals have adapted to their environment.

Complete one activity from among the following:

A WINDOW TO HAWAII

As you watch the program, sketch some of the animals or plants that you find especially interesting. Record the name of each plant or animal you sketch (don't worry about spelling at first) along with any information provided in the program. Then share your sketches and information with a group of classmates. With your group, create a mural that features the species you have identified. Use your sketches to do more detailed drawings. Write a short paragraph about each species and add it to the mural. Display the mural in your classroom, in the school library, or in a school corridor.

POLYNESIAN LEGENDS

In the program you learned about two Polynesian legends: One tells of Pele, the Hawaiian goddess of fire who created the islands with her fiery breath. The other tells the story of Kupe, a fisher whose lure was stolen by a giant octopus. Kupe sailed thousands of miles in search of the octopus. Eventually, he discovered what he called a land of birds —known today as New Zealand. Use library resources to find other Polynesian myths and legends. Then write some of your favorites in your own words and illustrate them. Create a book of your Polynesian myths and legends with others who have chosen this activity. Display the book in your classroom or in the school library.

Some of the books you may want to consult are:

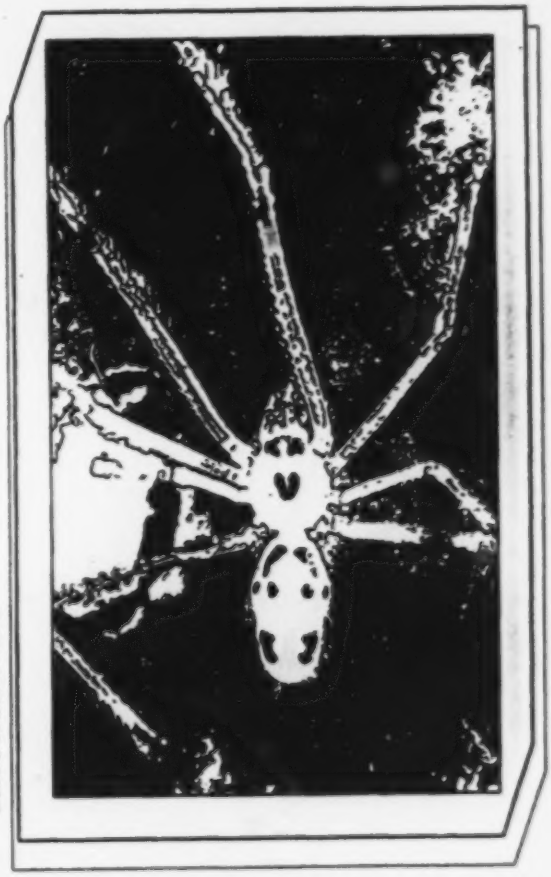
Amadio, Nadine. *Pacifica: Myth, Magic and Traditional Wisdom from the South Sea Islands.* Australia: Angus and Robertson, 1993.

Westervelt, William. *Hawaiian Legends of Ghosts and Ghost-Gods.* Boston: Charles E. Tuttle, 1991.

Zerner, Amy, and Zerner, Jessie. *Scheherazade's Cat and Other Fables from Around the World.* Boston: Charles E. Tuttle, 1993.

VOLCANOES

All 132 Hawaiian Islands are volcanic islands. Investigate how volcanic islands are formed. Create a model or draw a cross section that illustrates how a volcano works. Report your findings to your class, using your model or cross section as a visual aid.



Credit: © BBC/Gavin Thurston

The Happy Face Spider is one of Hawaii's unique species that has evolved in isolation.

OBJECTIVES

Students will:

- compare and contrast the Polynesians' navigational skills with those of the early European explorers;
- observe and analyze how the people and wildlife of the Polynesian islands shaped one anothers' destinies;
- explore how the arrival of foreign species affected the native plants and animals of New Zealand.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

conservation *noun:* using natural resources wisely; in this case, preserving endangered plants and animals.

extinction *noun:* a condition that exists when a plant or animal has no living representative.

fjord *noun:* a narrow, sheltered inlet of the sea formed by a glacier between cliffs or steep slopes.

mana *noun:* the magical power that, according to the Maori, lives within sacred objects or wildlife; for example, the kauri tree.

midden *noun:* a massive pile of garbage; for example, the remains of shellfish piled in heaps by the Maori in New Zealand.

SUGGESTED READING

For students who want to learn more about this topic, suggest the following:

Gray, William R. *Voyages to Paradise: Exploring in the Wake of Captain Cook.* Washington: National Geographic Society, 1981.

THE PIERCED SKY

PROGRAM OVERVIEW

This program focuses on the impact that European explorers and the people and wildlife of the Polynesian triangle had on one another. Several hundred years ago, the Maori of New Zealand believed that they were children of the land and treated their surroundings with reverence. For example, they deemed dolphins to be sacred and even considered the giant kauri trees to have spirits within them. Nevertheless, in order to survive, the Maori depleted much of the forests and hunted many species to extinction.

In the mid-1700s, Captain James Cook made the first of his three famous voyages to the Polynesian islands. Cook and his crew created detailed maps and identified, recorded, and, in some cases, preserved the unusual insects, fish, plants, animals, and birds that they found. The Europeans brought deadly diseases to the islands as well as animals and plants that competed with and overwhelmed many native species.

"The Pierced Sky," Program Five of the miniseries NOMADS OF THE WIND, chronicles the Europeans' early voyages to Polynesia. The program also highlights the affect the Europeans and the Polynesians had on one another's cultures and on the native wildlife. It concludes with scenes from a recent festival, hosted by the Cook Islanders, that celebrated Polynesian culture.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Ask students to discuss what they have learned about the Polynesians' navigational skills such as their use of ocean currents, cloud formations, stars, and so on. List their responses on the chalkboard. Then ask them to discuss what they know about European explorers such as Christopher Columbus and the instruments (such as the compass and the chronometer) they used to navigate great distances across the ocean. Write their responses on the board, and encourage students to compare the two lists.

Tell students that the program they will see, "The Pierced Sky," describes early voyages made by European explorers to the Polynesian islands, including an expedition by British explorer Captain Cook in the mid 1700s.

Distribute the Naturalist's Guide (student worksheet)

Duplicate and distribute the Naturalist's Guide (student worksheet) to students and preview it with them. As they watch the program, students should take notes about how the arrival of the Europeans affected the people and native species of Polynesia.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. The program points out that there are more endangered species in Hawaii than in all the United States mainland and that one innocent-looking suitcase could contain an ecological time bomb. What do you think can be done to protect native species? (Answers will vary.)
2. How did the naturalists aboard Captain Cook's ship record new species they discovered? What additional methods are used by naturalists today to document wildlife? (Naturalists on Cook's voyages made sketches, wrote observations, and preserved specimens. Today naturalists can film, photograph or videotape, study cell structure using a microscope, and conduct tests using the latest technological tools.)
3. How did the Maori use greenstone? (They used it to make tools for carving canoes, weapons for war, decorative jewelry, and sacred statues.)
4. How did the arrival of the Europeans affect the people and wildlife of Polynesia? (The Europeans introduced animals and plants that competed with and overwhelmed many of the native species. Diseases brought by the Europeans killed many Polynesians.)

THE PIERCED SKY

A naturalist observes the effects that non-native species, human population growth, and diminished natural habitats have on plants and animals.

Complete one activity from among the following:

A BATTLE OF NATURE

As you watch the program, use the chart to list information about various non-native species that were introduced to the Polynesian islands. Record the name of the species, why or how it was introduced (to control another species, by accident, etc.), and its effects on local plants and wildlife. Research some non-native species that have come to the United States (examples: kudzu vine, gypsy moth, killer bees). Discuss with a group what can be done to minimize damage.

Country	Name of Species	Why/How was it introduced?	What was the effect?
New Zealand	mongoose		
New Zealand	sheep		
Guam	brown tree snake		
Hawaii			

THE VOYAGES OF CAPTAIN COOK

Captain James Cook was responsible for providing the Western world with much of the early information about Polynesia and its plant life and wildlife. Do research about Captain Cook and the voyages he made. With a group, create a display that highlights his explorations and accomplishments. Using a map of Polynesia and colored yarn or string, chart the routes of his three voyages.

THE MAORI WAY OF LIFE

With a group, research the Maori, the first inhabitants of New Zealand. Use what you have learned from the program as well as library research. Discover what materials they once used to make their clothing, shelter, tools, weapons, and cooking implements. Use your research to write about a typical day in the life of a Maori child your age. In addition, discuss with your group what the Maori reaction might have been when they saw the Europeans using cloth, iron nails, metal weapons, forks, chairs, and so on.

Credit: © BBC/Peter Crawford

A Maori warrior.

VIDEO ORDERING INFORMATION

NOMADS OF THE WIND is available on home video cassette for $19.95 per episode or $89.95 for the entire 5-part series plus shipping. To order, call 1-800-336-1917 or 1-800-262-4727. You may also write to WNET Video Distribution, P.O. Box 2284, South Burlington, Vermont 05407. Please specify program title.

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Thirteen·wnet
Educational Resources Center
Ruth Ann Burns, Director

Project Director: Robert A. Miller
Supervising Editor: Christine Economos
Design: B.T. Whitehill
Project Coordinator: Christina L. Draper
Writers: Jordan Brown
Lois Grippo
Copy Editor: Edwina McMahon
Proofreader: Kevin E. Kennedy
Advisors: Dr. Kenneth A. Chambers
Assistant Chairman (retired)
Department of Education
American Museum of Natural History
John Kominski, Science Coordinator
New York City Board of Education

For the NATURE series

Host, Narrator, and Executive Editor: George Page
Executive Producer: Fred Kaufman
Science Editor: Janet Hess
Coordinating Producer: Janice Young
Manager: Eileen Fraher
Researchers and Writers: Susana Lee
Hildy Rubin
Associate Producers: Caroline Corney
Jessica Siegel
Production Assistant: Jill Clarke
Production Secretary: Kevin Boyle
Production Manager: John Schwally

For NOMADS OF THE WIND

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356 West 58th Street
New York, NY 10019

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